Description the present invention relates to the field of human morphology, and has as an aim a device of study of the mobility of the spinal column. The state of the art is represented by the patent FR 2287 888 delivered with the Doctor BADELON, in whom is described a device of study of the mobility of the spinal column of a subject in the frontal plan and the sagittal plan, including/understanding a horizontal base on which a subject takes seat upright, a vertical datum-line equipped with adjustable means to immobilize the basin or the thighs of the subject and a vertical slit in which slide a cursor associated with a mobile small rule graduated to measure the distance between the aforementioned vertical datum-line and the thorny apophyses of the subject, like three handles, on the right and on the left of the subject each one of these handles being connected by a cable to a sliding counterweight along the vertical datum-line, in front of a graduated scale. This device allows study of the complex lombo#pelvi-lémoral of a patient, the aforementioned complex being made up by rassociation of the lombo-crowned hinge and the coxo-femoral hinge. Il not only makes it possible to analyze established lumbagos, but still to detect in the child, as of the ten years age, of the anomalies factors of risk of overwork of the lombo-pelvi-femoral hinge, risking entrâîner a lumbago at the adulthood. For that, one asks about carrying out various movements, during which one can measure displacements of his spinal column in various ways: - by measurement of tlie distance between the vertical datum-line and the thorny apophyses of the subject, with stiff of the graduated small rule associated the sliding cursor on the vertical level of reference, - by measurement of the displacement of a counterweight related to a handle, that the subject is due to one or two hands, - by measurement of the angular displacement of the shoulders of the subject during a rotation of the chest. During these movements, the basin or the thighs of the subject can be possibly immobilized using the above-mentioned adjustable means. The measured values must be deferred manually on a preprinted table, and certain sizes must be calculated manually before carrying out the interpretation of the results, which lengthens the duration of rexamen. The purpose of the present invention is to propose an improvement of this device, in particular making it possible to avoid these stages of reading of displacements, manual carryforward on a table, and of calculation of intermediate values, and also allowing the edition of an automatic interpretation of the examination and proposals therapeutic. The present invention has as an aim a device of study of the mobility of the spinal column in the frontal plan and the sagittal plan, including/understanding a horizontal base on which a subject to be examined takes seat upright, a datum-line vertical interdependent of the base, equipped with adjustable means of locking in particular to immobilize the basin or the thighs of the subject and a vertical slit in which slide a cursor associated with a mobile small rule comprising an end close to the subject and an end far away from the subject, a first handle in front of the subject, one second handle with the left of the subject, and a third handle with the right-hand side of the subject, characterized in that the aforementioned handles are connected each one to a wire rolled up on an elastic device, interdependent of the unit formed by the horizontal base and the vertical datum-line and comprising an electric sensor measuring the length of wire unrolled when the aforementioned subject carries out various movements prescribed by keeping in hand a handle, and what the electric sensors are connected to a transducer connected to a microcomputer equipped with a printer and using a software adapted to carry out the acquisition and the memorizing of the measured values, as well as the posting or the impression of a sheet of results of interpretation of the examination, and therapeutic proposals. Advantageously, the end of the mobile small rule furthest away from the subject to be examined is equipped with a wire being rolled up on an elastic device interdependent of the unit formed by the horizontal base and the vertical datum-line and comprising a sensor electric measuring the length of unrolled wire when the cursor or the mobile small rule is moved. From the aforementioned end of the mobile small rule, the wire can extend

Exh. 5 A

horizontally to a pulley turning around an axis interdependent of the cursor, then vertically to the elastic device of rolling up. In an alternative of realization, the mobile small rule is equipped with a hollow channel and comprises a sliding wire inside of the aforesaid channel, a first end of the wire comprising a hook, one second end of the wire being rolled up on an elastic device interdependent of the unit formed by the base and the vertical datum-line, the elastic device comprising an electric sensor measuring the length of wire unrolled, and a cap comprising an external circular rim is placed on the head of the subject, the aforementioned rim having points of fastener to hang the hook and a throat external allowing rolling up of the wire Le hollow channel of the mobile small rule can communicate with lower longitudinal groove extending starting from the end from the small rule nearest to the subject until the end from the small rule furthest away from the subject, and the cursor can comprise a rotary pulley vertically penetrating inside the hollow channel by the aforementioned groove, so that the wire extends horizontally inside the channel from the hook to the pulley from the cursor, then to the elastic device of rolling up In an advantageous embodiment of the invention, the electric sensors measuring the length of unrolled wire are circular rheostats. The elastic devices of rolling up can be made up each one by a cylindrical reel interdependent of an axis fixed at an end of a return spring to rolling up of which the second end is interdependent of the unit formed by the base and the vertical datum-line, the aforementioned axis moreover being fixed at the axis of the circular rheostat. Each cylindrical reel can moreover comprise a helicoid groove worked on its external cylindrical surface, so that the wire is rolled up along the aforementioned helicoid groove. The transducer can moreover be connected to a goniometer electric made up of a case containing a sensor electric of measurement of rotation equipped with an axis being prolonged out of the aforesaid case by a stem, the aforementioned stem being intended to be held by an expert by applying the case against the sternum of the subject to be examined, in order to measure the rotation of the prone of the aforesaid bust in a horizontal plane. Advantageously, the sensor electric of the goniometer electric is a circular rheostat. In a particular embodiment, the adjustable means of locking include/understand means of measurement of the effort exerted by the subject on the aforementioned adjustable means of locking, during various prescribed movements. Advantageously, these means of measurement are piezoelectric sensors laid out in bearings of support placed at the points of contact between the iliaques spines of the subject and the adjustable means of locking, the aforementioned piezoelectric sensors being connected to the transducer. A handle of seizure equipped with a button of contact can be connected to the microcomputer so that when the software charged on the microcomputer requires a measurement, once that the subject is in the prescribed position and that one of the elastic devices of rolling up was actuated in a way wanted by one of the handles or the cursor or the small rule, or that the goniometer was actuated in a wanted way, the expert starts the acquisition of the measurement by the microcomputer while pressing on the button of the handle of seizure. The invention will be readily understood using the detailed description which follows, given as an example nonrestrictive compared to the joined drawings. On the drawings, - figure 1 is a diagrammatic sight in prospect for an embodiment of this invention front view; - figure 2 is a sight similar on figure 1, seen of back; - figure 3 is a sight of detail in prospect for the cursor and mobile small rule according to the present invention seen for the back. - figure 4 is a diagrammatic sight of unspecified elastic devices of rolling up, according to an embodiment of the invention; - figure 5 is a diagrammatic sight of the means electric and electronic of this invention; - figure 6 is a diagram illustrating the operation of the program implementing the device of this invention; - figure 7 is an example of assessment of examination published on printer, concerning the sagittal plan; - figure 8 is an example of assessment of examination published on printer, concerning the frontal plan and the horizontal plane; - figure 9 is a diagram of the mobile small rule and cap which is

associated to him in a particular embodiment of the invention;; and - figure 10 is a diagrammatic cut according to line 10-10 of figure 9. In its embodiment presented on figures 1 and 2, the device of this invention includes/understands a base 1 on which a subject to be examined (not represented) takes seat upright. This base comprises a podoscope (not represented). A datum-line vertical 2, interdependent of base 1, comprises adjustable means of locking 3 in particular to immobilize the basin or the thighs of the subject. The vertical datum-line 2 comprises also a vertical slit 40 in which slide a cursor 41 associated a mobile small rule 43 (cf figure 3) to measure the distance between the aforementioned vertical datum-line and the thorny apophyses of the subject, and the height of the aforesaid apophyses. This small rule slides horizontally in cursor 41. It comprises two ends: a close relation of the subject, and far away from the subject. As presented on figures 1 at 3, cursor 41 can be equipped with a means of tightening 42 making it possible to block it in position. A wire 20 can be attached at the end of the mobile small rule furthest away from the subject wire 20 passes in the throat of a pulley 44 turning around an axis interdependent of cursor 41, then goes down vertically to an elastic device from rolling up 7, which can for example be placed inside the base 1 Ainsi a vertical displacement of cursor 41 or one horizontal displacement of small rule 43 a certain length L involves lienroulement or the course of the same length L of wire on the elastic device of rolling up 6. The device of the invention includes/understands moreover three handles: a first handle 4 is placed in front of the subject, a second handle 5 is placed at the left of the subject, and a third handle 6 is placed at the right-hand side of the subject. Handles 4, 5 and 6 are connected each one to a wire 20 approximate length 1,20 m, being rolled up around an elastic device 7 which can for example be placed inside base 1. Each elastic device 7 includes/understands a cylindrical reel 21 interdependent of an axis 22. Reel 21 includes/understands two side cheeks 23 and 24, and a helicoid groove 25 worked on its external cylindrical surface, so that wire 20 is rolled up in a quite precise way along the aforementioned helicoid groove. This groove makes it possible to obtain a precision of rolling up of about 2 mm over a length of wire unrolled of 1,20 Mr. the axis 22 interdependent of reel 21 is fixed at an end of a return spring to rolling up 26, of which the second end is interdependent of the unit formed by base 1 and the vertical datum-line 2. The axis 22 is also fixed at the axis of a circular rheostat 27, connected electrically to a transducer 10 (see figure 5) which is a analogical-digital converter here. Thus, a linear displacement of a handle 4, 5, 6, a displacement of cursor 41 or small rule 43 is converted into angular displacement of an elastic device of rolling up 7, by rolling up or unfolding of a wire 20. Angular displacement is in its turn converted into analogical signal electric by means of rheostat 27 correspondent, then in digital signal by transducer 10. The device of the invention includes/understands moreover a goniometer electric 14 composed of an appreciably parallelepipedic case 15, containing a circular rheostat, whose axis is prolonged out of case 15 by a stem 16. The goniometer is used to measure rotation on the right or on the left chest of the subject; for that, an expert holds between his fingers the stem 16 vertical, case 15 directed downwards, and applies case 15 against the sternum of the subject. If the subject carries out a rotation of the chest of an angle 0, case 15 and the rheostat which it contains turn of same angle 0. The rheostat is connected electrically to transducer 10; it thus transmits to transducer 10 an analogical signal electric representative of the swing angle of the chest of the sujet.Ce analogical signal is transformed by transducer 10 into digital signal. Transducer 10 is connected to a microcomputer 11. Microcomputer 11 classically includes/understands a central processing unit, a storage unit of data such as a disk drive, a means of posting such as a screen, and means of seizure such as a keyboard. Microcomputer 11 moreover is connected to a printer 12 and a handle of seizure 17 comprising a button of contact 18. An adapted software is charged on microcomputer 11. During the examination, the software asks for the measurement of certain parameters. The subject must then take a

particular position, while holding with one or two hands one of handles 4, 5, 6. Or the expert applies the goniometer 14 to the sternum of the subject, while the subject carries out a rotation of the chest. Or the expert places cursor 41 at a certain height, or it applies the mobile small rule 43 against a thorny apophysis of the subject, the aforementioned prone taking a prescribed position. These various actions act on one of the devices 7, 14, which transmits an analogical signal electric to the transducer 10, which itself transforms this analogical signal into digital signal. When the expert wants that measurement is recorded, it presses on button 18 of the handle of seizure 17 connected to the microcomputer it; microcomputer 11 then questions the transducer 10 which transmits in return to the microcomputer the digital signal representative of measurement. During an examination, the software charged on microcomputer 11 passes for example by the following stages, represented on the flow chart of figure 6: - to enter to the keyboard of the information of identity of the patient (block 31): name, first name, age, size, weight, sex; - automatically to acquire values of displacement of the spinal column thanks to the electric sensors connected to three handles 4, 5, 6 (block 32): position of reference PR (prone upright back to the vertical datum-line, handle 4 behaviour with two hands), inflection of trunk FT (prone leaning forwards, handle 4 behaviour with two hands), inflection of the rachis FR (prone leaning forwards, basin immobilized by device 3, handle 4 behaviour with two hands), latéroflexion left LFG (prone leaning on its left side, basin immobilized by device 3, left handle 5 behaviour of the left hand), latéroflexion right LFD (prone leaning on its right side, basin immobilized by device 3, right handle 6 behaviour of the hand right - to enter to the keyboard the height of locking of the subject (block 33); - automatically to acquire the other measurements taken with stiff of cursor 41 and mobile small rule 43 (block 34); for each one of these measurements, the expert places initially cursor 41 at the desired height and fixes it, for example using the means of tightening 42; it then starts the acquisition of the first measurement, corresponding to a first length of wire 20 unrolled of the elastic device 6 associated the cursor and the mobile small rule. In this position, the end of the small rule nearest to the subject must be pushed back on the vertical outline level of reference 2. The the aforementioned first measurement makes it possible to record the height at which cursor 41 is placed. The expert moves small rule 43 then horizontally in order to apply it against a thorny apophysis of the subject; he starts then, using the handle of seizure 17, the acquisition of the second measurement, corresponding to a second length of unrolled wire 20; the difference between the first measurement and the second measurement gives the distance between the thorny apophysis of the subject and the vertical plane of reference 2.Les measurements thus made can be for example: extension of the rachis ER (distance between the appendix xyphoïde and the vertical datum-line 2, when the subject leans behind, vis-a-vis plan 2, basin immobilized by device 3), extension of the trunk AND (distance between the appendix xyphoïde and the datum-line 2, when the subject leans behind, vis-a-vis plan 2, basin immobilized by device 3); - to acquire automatically with stiff goniometer electric 14 (block 35) values of rotation of the trunk on the right and on the left, respectively RD and RG (swing angle of the manubrium sternal in the horizontal plane, respectively on the right and on the left;; - to post with the screen or to print an assessment of the examination (block 36), giving the values of measurements HV, PR, FT, FR, LFU, LFD, ER, AND, RD, RG, as well as the computed values of inflection of the hips FH = FT - FR, of extension of the hips EH = AND - ER, and of the indices rachimetric in extension RE = PR X ER and in inflection RF = PR X FR. AND SET FT X FT the assessment of the examination breaks up advantageously into: has/an assessment in a plan sagittal (figure 6), pointing out the RE values (entitled IRex on the graph), RF (IRfl on the graph), PR and HV (RIAS on the graph), and subdivided in two grahiques comprising each one three columns and a vertical scale from 0 to 10. Each column relates to a measurement; it comprises a point representative of a coefficient ranging

between 0 and 10, obtained by comparison of measurement to fixed values then by linear interpolation, a point representative of the average value of measurement, and the indication in light of the value of measurement. The first graph relates to the extension. Il comprises: - a baptized column "sspa" (former under-pelvic sector) relating to measurement EH of extension of the hips, - a baptized column "trunk" relating to measurement AND, - a baptized column "rachi" relating to measurement ER. The three points representative of measurements are joined by segments of right-hand sides, just as the three points representative of the average values. The second graph relates to the inflection. Il comprises: - a baptized column "rachi" relating to measurement FR, - a baptized column "trunk" relating to measurement FT, - a baptized column "sspp" (posterior under-pelvic sector) relating to measurement EH of inflection of the hips. The three points representative of measurements are joined by segments of right-hand sides, just as the three points representative of the average values. B/an assessment in a frontal plan (figure 7), comprising two columns and a vertical scale of O with 10. The columns are used according to the same principle as in the sagittal assessment. One of the columns relates to measurement LFG, while the other relates to LFD. The two points representative of measurements are joined by segments of right-hand sides, just as the two points representative of the average values. Ci an assessment in a horizontal plane (figure 7) comprising two columns and a vertical scale from 0 to 10. The columns are used according to the same principle as in the sagittal assessment. One of the columns relates to the measurement of RU, while the other relates to RD. The two points representative of measurements are joined by segments of right-hand sides, just as the two points representative of the average values. This presentation allows a fast interpretation of the examination by the expert. During the development of the assessment of the examination the whole coefficients ranging between 0 are calculated and 10 CEXH, CEXT, CEXR, CFLXR, CFLXT, CFLXH, CLFG, CLFD, VINTAGE, CRD, starting from respective measurements EH, AND, ER, FR, FT, EH, LFG, LFD, RU, RD. Each one of these coefficients are obtained by comparison of measurement corresponding to fixed values. Following this assessment, an interpretation of the examination elaborate automatically and is printed or posted with the screen (block 37). The diagnosis is carried out by combining between them various sentences or parts of sentences prepared in advance and contained in the data-processing program. This interpretation includes/understands for example the following parts: - recall of general data on the patient: name, first name, sex, age, size, weight; - study of the sagittal plan, in inflection; the diagnosis is carried out starting from following criteria:CFLXR - CFLXH, FR comparison and EH, and CFLXT; - study of the sagittal plan, in extension; the diagnosis is carried out starting from the following criteria: CEXR - CEXH, ER comparison and EH, and CEXr; - interpretation of the shift enters the inflection and the extension of the rachis: starting from the following criterion: COOK - CEXR; - study of the frontal plan; starting from the following criteria: LFD and LFG; - study of the horizontal plane, according to following criteria:CRD, BELIEVED; - study of the operation of the lumbar hinge dorso; - study of the lesions of the mobile lumbar unit, according to the following criteria: AGE, CFLXT, CEXT; - study of the posterior rachis; the diagnosis is carried out starting from the following criteria: CEXR, minimum of CFLG and CFLD, LFG - LED, CFLG CFLD, maximum of CLFG and KEY. Therapeutic proposals then elaborate and are printed or posted with the screen automatically (block 38). They are carried out like the diagnosis, by combining various sentences or parts of sentences prepared in advance and contained in the data-processing program. These proposals break up for example into: - prophylanie general; - rehabilitation of the former group (inflection): according to CFLXT and Cflxr-cflxh; - rehabilitation of the posterior group (extension): according to CEXT and Cexr-cexh. In an alternative of realization of the invention, the adjustable means of locking 3 include/understand means of measurement of

reffort exerted by the subject on the aforementioned adjustable means 3. These means of measurement can consist for example of piezoelectric sensors laid out in bearings of support laid out on the aforementioned adjustable means with the points of contact between the iliaques spines of the subject and the aforementioned adjustable means 3. These sensors are connected to the transducer 10, which allows acquisition by microcomputer 11 of the measured values. Microcomputer 11 can be equipped with a software adapted to evaluate the pressures undergone by the vertebral discs of the subject during prescribed movements, starting from the values of the measurements made by the piezoelectric sensors. In another alternative of realization of the invention, adapted to measure the mobility of the cervical rachis, small rule 43 hollow, like is represented schematically on figures 9 and 10. The small rule comprises an interior channel 4á, communicating with the outside of the small rule by a lower longitudinal groove extending from the end of the small rule nearest to the subject until the end furthest away from the subject the small rule slides in a hollow part of cursor 41, the aforementioned hollow part comprising itself a groove in correspondence with the groove of the small rule, in order to allow the passage in the two grooves of a pulley 55 rotary rise on the cursor 41, which penetrates thus partly in the channel 4á Ainsi, wire 20 associated the mobile small rule extends vertically starting from the elastic device from rolling up to the pulley 55 rotary rise on cursor 41. Then wire 20 extends horizontally inside hollow small rule 43 until the end from the aforementioned small rule nearest to the subject, where the wire ends in a hook 54. As long as the small rule is used like previously described, to measure the height of the thorny apophyses of the subject and their distance compared to the vertical plane of reference 2, hook 54 is fixed at the end of the small rule nearest to the subject: the device functions then exactly as described previously. When one wants to measure the mobility of the cervical rachis subject, one places on his head a cap 50 made up of a hair-band 52 on which a rigid external circular rim 51 is fixed, by three radial stems 56 rigid. Rim 51 is equipped with an external throat 59. The diameter external of the rim is for example 40 cm. Advantageously, the hair-band comprises on the face of the subject a device 57 of adjustment to fast fixing, to adapt its circumference to the head mast of the subject. The radial stems 56 are respectively on the level of the temples and the back of cranium of the subject. On the back of the head of the subject and on the face of the subject, rim 51 comprises points of fastener for hook 54, respectively 53 and 58. The subject is placed on the horizontal base 1, back in the vertical plane of reference 2, and the adjustable means 3 are used to immobilize its shoulders. Cursor 41 is placed at height of cap 50, hook 54 is fixed at the point of fastener 53 and small rule 43 is placed in contact with rim 51, the subject having the right head. The expert then starts acquisition by microcomputer 11 of a first measure of length of wire 20 unrolled. The subject must then lean its head to the maximum forwards in the sagittal plan by involving wire 20 fixed on cap 50. The expert then starts the aquisition of a second measure of length of wire 20 unrolled, of which the difference with the first measurement gives a value of inflection of the rachis cervical.De the same way, one measures the right side inflection and left of the cervical rachis while making lean the head of the subject on the right and on the left in the frontal plan, and one measures rotation on the right and on the left while making turn the head of the subject on the right in and on the left in a horizontal plane. During the measurement of rotation on the right and on the left, wire 20 is rolled up in throat 59 of rim 51 when the subject turns the head; the diameter external of rim 51 being in memory of microcomputer 11, the software charged in microcomputer 11 can thus translate into swing angle the length of wire 20 unrolled during this movement. After these measurements, the subject is placed vis-a-vis the datum-line 2, the shoulders immobilized by the adjustable means 3, and hook 54 is fixed on the point of fastener 58 of cap 50. Small rule 43 is first of all placed against rim 51 when the subject holds its right head, and the expert starts the acquisition a first length of wire 20 unrolled. Then the subject

must lean the head to the maximum behind, in the sagittal plan; the expert then starts acquisition of one second measure of length of wire 20 unrolled, of which the difference with the first measurement gives a value of extension of the cervical rachis.

Claims

1. - Device of study of the mobility of the spinal column in the frontal plan and the sagittal plan, including/understanding a horizontal base (1) on which a subject to be examined takes seat upright, a datum-line vertical (2) interdependent of the base (1), equipped with adjustable means of locking (3) in particular to immobilize the basin or the thighs of the subject and a vertical slit (40) in which slide a cursor (41) associated a mobile small rule (43) comprising an end close to the subject and an end far away from the subject, a first handle (4) front the subject, one second handle (5) with the left of the subject, and a third handle (6) with the right-hand side subject, characterized in that the aforementioned handles (4, 5, 6) are connected each one to a wire rolled up on an elastic device (7), interdependent of the unit formed by the horizontal base (1) and the vertical datum-line (2) and comprising an electric sensor measuring the length of unrolled wire when the aforementioned subject carries out various movements prescribed by keeping in hand a handle, and what electric sensors are connected to a transducer (10) connected to a microcomputer (11) equipped with a printer (12) and using a software adapted to carry out the acquisition and the memorizing of the measured values, as well as the posting or the impression of a sheet the examination and of therapeutic proposals.

2. - Device according to claim 1, characterized in that the end of the mobile small rule (43) furthest away from the subject to be examined is equipped with a wire (20) being rolled up on an elastic device (7) interdependent of the unit formed by the horizontal base (1) and the vertical datum-line (2) and comprising a sensor electric measuring the length of unrolled wire when the cursor (41) or the mobile small rule (43) is moved.

3. - Device according to claim 2, characterized in that starting from the aforementioned end of the mobile small rule (43), the wire (20) horizontally extends to a pulley (44) turning around an axis interdependent of the cursor (41), then vertically to the elastic device (7) of rolling up.

4. - Device according to claim 1, characterized in that the mobile small rule (43) is equipped with an interior channel (4á) and comprises a sliding wire (20) inside of the aforesaid channel, a first end of the wire (20) comprising a hook (54), one second end of the wire (20) being rolled up on a device elastic (7) interdependent of the unit formed by the base (1) and the vertical datum-line (2), the elastic device comprising an electric sensor measuring the length of wire unrolled, and in what a cap (50) comprising an external circular rim (51) is placed on the head of the subject, the aforementioned rim (51) having points 58) to hang the hook (54) and one throat external (59) allowing rolling up of the wire (20).

5. - Device according to claim 4, characterized in that the hollow channel (4á) of the mobile small rule (43) communicates with outside at least by a lower groove longitudinal extending starting from the end from the small rule nearest to the subject until the end from the small rule furthest away from the subject, and in what the cursor (41) comprises a rotary pulley penetrating inside the hollow channel (4á) by the aforementioned groove, so that the wire (20) extends horizontally inside the channel (4á) from the hook (54) to the pulley (55) from the cursor, then vertically to the elastic device of

6. - Device according to one of the preceding claims, characterized moreover in what the electric sensors measuring the length of wire unrolled are circular rheostats (27).

7. - Device according to any of claims preceding, characterized moreover in what the elastic devices of rolling up (7) are made up each one by a cylindrical reel (21) interdependent of an axis (22) fixed at an end of a return spring with rolling up (26) of which the second end is

interdependent of the unit formed by the base (1) and the vertical datum-line (2), the aforementioned axis (22) moreover being fixed at the axis of the circular rheostat (27).

8. - Device according to claim 7, characterized moreover by the fact that each cylindrical reel (21) comprises a helicoid groove (25) worked on its external cylindrical surface, so that the wire (20) is rolled up along the aforementioned groove hélicoidale (25).

9. - Device according to any of the preceding claims, characterized in that the transducer (10) moreover is connected to a goniometer electric (14) made up of a case (15) container a sensor electric of measurement of rotation equipped with an axis being prolonged out of the aforesaid case (15) by a stem (16), the aforementioned stem being intended to be held by an expert by applying the case (15) against the sternum of the subject to be examined, in order to measure the rotation of the prone of the aforesaid bust in a horizontal plane.

10. - Device according to claim 9, characterized in that the sensor electric of the goniometer electric (14) is a circular rheostat.

11. - Device according to any of the preceding claims, characterized in that the adjustable means of locking (3) include/understand of the means of measurement of the effort exerted by the subject on the aforementioned adjustable means of locking, during various prescribed movements.

12. - Device according to claim 11, characterized in that the aforementioned means of measurement are sensors piezoclectric laid out in bearings of support placed at the points of contact between the iliaques spines of the subject and the adjustable means of locking (3), the aforementioned piezoelectric sensors being connected to the transducer (10).

13. - Device according to any of the preceding claims, characterized in that a handle of seizure (17) equipped with a button of contact (18) is connected to the microcomputer (11) so that when the software charged on the microcomputer (11) requires a measurement, once that the subject is in the prescribed position and that one of the elastic devices (7) was actuated in a wanted way, or that the goniometer was actuated in a wanted way, the expert starts the acquisition of the measurement by the microcomputer (11) while pressing on the button (18) of the handle of seizure (17).